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RESEARCH ARTICLE

Do the More Advantaged Dominate Deliberation? Using Transcripts for Identifying Relationship Between Social Advantage and Deliberation

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Critics of deliberative democracy fear that it may lead to the 'domination of the more advantaged,' where participants with less social advantage struggle to speak logically and defer to more advantaged peers. This study analyzed 9,810 speeches by 664 participants nested in 116 groups on an Online Deliberation Platform, using dictionary-based and machine-learning methods, along with Zero-Inflated Poisson and Zero-Inflated Beta regression models. The study also examined whether group opinion changes aligned with the pre-deliberation views of more advantaged participants. Findings show that while socially advantaged participants spoke more favorable to the traditional standards of deliberation, their opinions did not necessarily influence the opinions of less advantaged participants.

Keywords: domination; social inequality; LIWC; LLM; political inequality; mini-public deliberation

Introduction

Deliberative democracy assumes that through inclusive deliberation, citizens make thoughtful decisions (Fishkin 1995; Vrydagh 2023). It involves group communication centered on reasoned and respectful argumentation (Beauvais 2020). Ideally, participants weigh diverse perspectives, consider pros and cons, and reach decisions that reflect both personal and community interests, free from emotional manipulation or misinformation.

However, the democratic nature of deliberation itself warrants scrutiny. While deliberation values reasoned arguments, critics argue that it can favor those with social privilege—typically male, White, and higher class—thereby perpetuating inequality. Critics contend deliberative skills vary, leading to the deference from less privileged participants (Fraser 1990; Hooghe 1999; Sanders 1997; Young 1997). They argue that deliberation can never be equal across different social statuses and cannot guarantee its promise of the 'unforced force of the better arguments' (Habermas 1996, p.306) winning, because better arguments align with social privilege. This raises concerns that deliberation could produce undemocratic outcomes, favoring the views of socially advantaged participants: the domination by the more advantaged. This study seeks to explore the potential domination in the 'Shaping Our Future' Deliberative Poll of 2021 using its transcripts and survey data.

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Social inequality in deliberative speech styles and representation

Deliberation contrasts with other forms of communication because it involves reasoning about the arguments in the discussion (Bächtiger et al. 2018; Fishkin & Mansbridge 2017). Participants listen to what others think, consider the pros and cons, and decide what be the best for the community. Participants do not act out of prejudices but engage in rational reasoning during deliberation. Classically, deliberative ideals rest on reason, which reason would compete for the common good. Contemporary deliberation scholars have moved beyond and incorporated the role of self-interest and mutual justifiability. Nevertheless, the field still underscores the importance of providing reasoned justifications (Mansbridge, 2015).

Scholars have noted that this persistent emphasis on rational justifiability can inadvertently privilege those already adept at formal discourse, thus raising concerns about whose voices truly matter in deliberation. Sanders (1997) put it, 'Some citizens are better than others at articulating their arguments in rational, reasonable terms. [...] taking deliberation as a signal of democratic practice paradoxically works undemocratically' (pp. 348–349). This is because deliberation 'was governed by protocols of style and decorum that were themselves correlates and markers of status inequality' (Fraser 1990, p.63). Those protocols have prevented citizens of a particular race, gender, and class from being equal. Pointing out that norms of deliberation 'privilege speech that is formal, and general,' Young (1997) argued that this type of speech is not innately universal. Lupia and Norton (2017) also

pointed out that when people speak, they carry their social status, creating differences in the significance of the arguments based on the level of privilege. Therefore, social hierarchies project inequality into deliberation.

Whether social status affects an individual's ability to articulate themselves in deliberation, deliberative ability, has been investigated in three ways: examining deliberation's multifaceted ideals, measuring the space an individual occupies during discussion, and assessing an individual's impact on group decision-making. So far, empirical studies seem to support critics' concerns that deliberation advantages those who already hold social advantage and thus is undemocratic.

First, holistic measures that consider deliberative ideals correlate positively with social advantage. The Deliberative Quality Index (DQI) evaluates speech based on participation equality, level of justification, orientation toward the common good, respect among participants, constructive politics (reaching consensus), and reciprocal respect (Bächtiger, Gerber & Mm Fourner-Tombs, 2022; Steiner 2012). In Europolis, a transnational Deliberative Poll on European Union policy proposals, working-class participants scored lower on the DQI mainly for not mentioning the global economy—an indicator of the common good—rather than lacking justification (Gerber et al. 2018). Comparisons between citizens and political elites similarly imply that one's social position increases familiarity, since politicians scored higher on the DQI than citizens (Jennstål 2019; Mockler 2022; Pedrini 2014).

Second, the less advantaged speakers appear less important. Males are represented more often than females. For instance, in an experimental, unmoderated political deliberation, females spoke more than males only when they had a critical mass, or when the groups voted unanimously (Karpowitz, Mendelberg & Shaker 2012). Moreover, participants with greater resources tend to participate more actively (Himmelroos, Rapeli & Grönlund 2017). Observations from local townhall meeting in India also support women faced disadvantages in agenda setting (Parthasarathy, Rao & Palaniswamy 2019). Furthermore, identical arguments from a female-passing character carried less authority than those from a male-passing character, illustrating how females remain underrepresented (Beauvais 2021).

Third, critics fear that the socially less advantaged participants may be dominated by the more advantaged when opinions form (Mansbridge 2010; Sanders 1997; Young 1990). Rather than weighing the merits of the arguments themselves, less advantaged participants might rely on the speaking skills of their privileged counterparts, distorting public will formation. Lupia and Norton (2017) explained: 'The communicative acts that precede the outcome will use language that conveys power. They will be used by people who are more and less skilled in using language to acquire power. If participants are not paying close attention to these skill imbalances, and if the deliberative rules are not built to mitigate deleterious effects of such imbalances, participants are likely to be swayed by the skilled' (p. 73). Indeed, well-educated group leaders strongly influenced less educated participants in an unstructured public deliberation in sub-Saharan Africa (Humphreys, Masters & Sandbu 2006). Similarly, jurors of color changed their opinions more frequently than White jurors, altering the outcome of the jury verdicts (Karpowitz et al. 2024). These findings suggest that participants with higher status often dominate opinion formation.

Deliberation has not been equal across participants. Historically empowered groups—men, Whites, and higher class—tend to speak more and receive greater representation in deliberation than historically marginalized groups. Thus, deliberation is not as democratic as it aspires to be. This study examines whether social status translates into deliberative advantage regarding how individuals deliberate and how opinions form.

Hypothesis 1: Socially more advantaged participants will exhibit greater deliberative advantage.
Hypothesis 2: Socially more advantaged participants' opinions will affect group opinion formation.
Hypothesis 3: The opinions of more deliberatively advantaged participants will influence those of less advantaged participants.

Methods

Data

Data for the 'Shaping Our Future' Deliberative Poll,[1] held on May 1–2, 2021, were provided by Stanford Deliberative Democracy Lab. The event included 664 young American adults to address growing importance of young voters in America. Participants were primarily recruited from 35 postsecondary institutions, with additional members from Generation Lab to diversify educational backgrounds; hence, most of the sample was a convenience sample, and not representative of the national young voters (Stanford Deliberative Democracy Lab 2021). Of these participants, 623 provided demographic data, and 611 completed opinion and knowledge surveys. The number of participants completing all procedures was 589 on Day 1 and 544 on Day 2. The event took place on an online platform developed by Stanford Crowdsourced Democracy Team and Stanford Deliberative Democracy Lab, featuring automated moderation and transcription.

The Deliberative Poll followed a standard seven-step process: recruitment, pre-deliberation survey, distribution of briefing materials, random assignment to small groups (based on arrival time), small-group discussions, plenary sessions with expert responses, and post-deliberation survey. On Day 1, participants deliberated on three electoral reform topics, and on Day 2, discussions focused on the Civilian Climate Corps and economic inequality. All topics were covered in both small-group discussions and plenary sessions. Participants chose whether to attend both days without prior knowledge of the specific agendas. Outlines of agendas are in Appendix A.

Participants

Table 1 summarizes the demographic characteristics of the 623 participants who provided their information. The sample comprised 56% women (n = 349), 39% men (n = 246), and 4.5% non-binary or other genders. In terms of education, 74% (n = 464) were more educated, with 47% (n = 295) pursuing a bachelor's degree and 27% (n = 169)

holding or pursuing higher degrees. The Spearman correlation analysis revealed that younger participants did not necessarily lack educational attainment ($\rho = -0.02$, $p = 0.55$). The racial composition included 45% White participants (n = 282), 20% Asian (n = 122), 13% Black (n = 82), 11% Latinx (n = 68), and 11% from other racial backgrounds (n = 69). Participants were distributed across 60 groups on Day 1 and 56 groups on Day 2, each averaging 10 participants, reflecting the overall demographic distribution. The group characteristics are in **Table 2**.

Measurements

Deliberative advantage. Drawing on the literature, this research measured deliberative advantage using four variables: speaking time, speaking turns, number of justified speech acts, and sophisticated language use (e.g., Dutwin 2003; Karpowitz, Mendelberg & Shaker, 2012; Siu 2017). Each variable is detailed below.

Speaking time. The online platform tracks the total time a participant spent speaking each day after pressing the 'Request to Speak' or 'Interrupt' button, provided the

Table 1: Categorical demographic information about the participants.

Category	Day 1	Day 2	Day 1 + Day2 + Absentee
	N (%)	N (%)	N (%)
Gender			
Female	328 (56%)	306 (56%)	349 (56%)
Male	234 (40%)	212 (39%)	246 (39%)
Other	28 (4%)	26 (4%)	28 (4%)
Education			
Less Educated	144 (24%)	127 (23%)	159 (26%)
9th to 12th grade, no diploma	22 (4%)	18 (3%)	24 (4)
High school graduate or equivalent	16 (3%)	14 (3%)	24 (4)
Enrolled for associate's degree	56 (9%)	50 (9%)	59 (9%)
Associate's degree	9 (2%)	9 (2%)	10 (2%)
Some college, no degree	28 (5%)	25 (5%)	29 (5%)
Enrolled other	13 (2%)	11 (2%)	13 (2%)
More Educated	446 (76%)	417 (77%)	464 (74%)
Enrolled for a bachelor's degree (baseline)	285 (48%)	263 (48%)	295 (47%)
Well Educated	161 (27%)	154 (28%)	169 (27%)
Bachelor's degree	77 (13%)	74 (14%)	81 (13%)
Enrolled for graduate or professional degree	61 (10%)	57 (10%)	63 (10%)
Graduate or professional degree	23 (4%)	23 (4%)	25 (4%)
Race			
White	274 (46%)	256 (47%)	282 (45%)
Asian	116 (20%)	109 (20%)	122 (20%)
Black	73 (12%)	64 (12%)	82 (13%)
Latinx	64 (11%)	60 (11%)	68 (11%)
Other	63 (11%)	55 (10%)	69 (11%)
Total	590	544	623

Note: Numbers in parenthesis represent the proportion respecting the total sample. Categories indented and bolded are the criteria for more advantaged status.

Table 2: Group characteristic by its composition.

Number of participants by social advantage	Mean	SD	Min	Max
All members	10.18	1.23	6	15
Males	3.83	1.61	0	8
Whites	4.57	1.77	1	8
Enrolled in college (baseline)	4.72	2.07	1	9
Highly educated	2.72	1.74	0	8

Note: N = 116 (Groups in Day 1: 60, Groups in Day 2: 56).

speech was recorded through the microphone and was audible to others. Speaking time is measured in seconds. Participants with room assignment logs but no recorded speech acts were coded as 0.

Speech turns. The total number of speech turns per day logged if the speech was audible to others by the online platform was used to measure this variable. Participants with log records of room assignments but no recorded speech were coded as 0.

Number of justified speech acts. Adapting from DQI's Justification category, I counted the number of speech acts per speaker that contained relevant arguments extracted by DeliBERT, a machine-learning program designed to categorize arguments related to the proposals (Siu, Joseph & Hu 2024). Co-created by Stanford Deliberative Democracy Lab and Fileread Inc., a startup specializing in legal documents, DeliBERT was initially trained on presidential debates using Bidirectional Encoder Representations from Transformers (BERT) to extract premises and claims. It then employs Generative Pre-trained Transformer-4 (GPT-4) to summarize the extracted premises and claims according to researcher-provided proposals, categorizing each argument as supporting or opposing the proposal. Siu, Joseph and Hu (2024) reported that using transcripts from an Electoral Reform Deliberative Poll (Voices of Future), DeliBERT could annotate speech acts (F1 = 0.76) as effectively as human coders (F1 = 0.79), but faster.

In its most recent version, which recognizes story-telling as a valid form of justification, the DQI evaluates the quality of reasoning on a six-point scale, from 1 (no reasoning) to 6 (two or more logically linked reasons) (Steiner 2012). However, dismissing a strong single argument in favor of multiple weaker ones can be misleading (Chen 2021), since one argument may outweigh several lesser arguments if it addresses a critical value. Accordingly, I used DeliBERT's determination of whether an argument supports or opposes a proposal to measure the linkage between justification and claim. Participants assigned to a small group but who never spoke were coded as 0. Examples of DeliBERT's assessments, including how it judges argument relevance to the topic, appear in Appendix B.

Sophisticated language use. The degree of sophisticated language use was determined with the analytical thinking score (hereafter analytical thinking) from the Linguistic Inquiry and Word Count (LIWC) 22 program, a dictionary developed to assess psychometrics of a given text (Pennebaker et al. 2022). Analytical thinking is defined as 'a deliberate mode of thought wherein complex concepts are deconstructed into more manageable components and their interrelations' (Jordan et al. 2019, p.3477). When people produce analytical writings, they tend to use more articles and prepositions to incorporate different concepts. In contrast, communicating in an informal, personable style, people tend to use more pronouns, adverbs, negations, auxiliary verbs, and conjunctions (Jordan et al. 2019; Pennebaker et al. 2014). Reflecting psychological research, LIWC 22 summarizes analytical thinking as a single variable based on the relative use of function words in each corpus (Jordan et al. 2019; Pennebaker et al. 2022). Therefore, analytical thinking measures sentence complexity in terms of logical and formal structure, addressing the concerns raised by critics of deliberation.

Analytical thinking is comparable to cognitive complexity (CC), a construct often used in deliberation research (e.g., Brundidge et al. 2014; Wyss, Beste & Bächtiger 2015). CC refers to the ability to consider multiple perspectives, discern ideas, and integrate them (Houck et al. 2022; Wyss, Beste & Bächtiger 2015). However, the measurement commonly used in deliberation literature, suggested by Wyss et al. (2015), relies on LIWC2007 categories that are now deprecated due to low internal reliability (Pennebaker et al. 2015). Consequently, this research uses analytical thinking introduced in LIWC in 2015 to measure cognitive abilities reliably (Markowitz 2023).

Scores from each speech act were aggregated to produce a mean analytical thinking score per person, capturing each individual's average ability to speak in a sophisticated manner. Each score was divided by 100, so the scores close to 1 suggest formality, whereas values close to 0 imply personable language use. Participants who never spoke were coded as 0. Examples of speech acts with low and high analytical thinking appear in Appendix B.

Pressure. Pressure indicates the burden a participant feels after they learn their opinion is different from those of vocal participants. I measured pressure as the pre-deliberation opinion difference between each participant and the top 25% of group members, ranked by their expressiveness. Expressiveness is the average of four standardized indicators—speaking time, speech turns, justified arguments, and language sophistication.

Socially advantaged status. Building on literature (e.g., Beauvais 2021; Luskin et al. 2022; Sanders 1997; Siu 2017), socially advantaged status is defined as being male, White, and more educated. Since income level was loosely defined in the survey,[2] education was used as a proxy for social class. To account for the high proportion of participants who were in college at the time of study, this research uses them as the baseline group for education. Participants enrolled in education beyond college are viewed as having greater advantages, while those with less education than the baseline will be viewed as having lower advantages.

Attitudes about proposals. All responses were collected via the online survey tool Qualtrics, where participants accessed surveys and self-administered their opinions on computers or mobile phones. They indicated their attitudes toward each proposal using an 11-point Likert scale, ranging from 0 (Strongly Oppose) to 10 (Strongly Favor), with 5 signifying a neutral position. Participants could also select 'No Opinion' option, and they were treated as missing data.

Domination. If a group's post-deliberation average opinion about an issue went to the same direction of the group's pre-deliberation average opinion of the

advantaged participants, the group was regarded to be 'dominated' on that issue. The advantaged participants were identified with eleven combinations of socially advantaged status. The mathematical notation on the measurement is outlined in Appendix D.

Data analysis plan

Hypothesis 1, which posits that socially advantaged participants have the greater deliberative advantage, was examined using mixed-level zero-inflated Poisson (ZIP) models and a zero-inflated Beta (ZI-Beta) model with socially advantaged status due to the deliberative advantages' distributional characteristics and the excess zeros in counts (ZIP) and proportions (ZI-Beta). Excess zeros refer to zeros that do not follow the expected distribution and can result from structural, research design, observer, and random errors[3] (Zuur et al. 2009).

Zero-inflated models first separate zeros and non-zeros and estimate zeros via logistic regression. Then, they fit Poisson or Beta regression to the non-zero cases. In this study of speech time, excess zeros are cases that do not conform to a Poisson distribution, possibly due to structural barriers such as gender, racial, and educational disparities. The ZIP model is particularly useful for simultaneously modeling count data and the excess zeros that arise from underlying mechanisms (Atkins & Gallop 2007).

The mixed-level ZIP and ZI-Beta models account for each participant's speaking behavior within their randomly assigned groups. Speech time, speech turn, number of justified speech acts, and the degree of sophisticated language use were each regressed on participant's gender, race, and education levels. Mixed-level ZIP models estimated speech time, speech turn, and number of justified speech acts, and a mixed-level ZI-Beta model was applied to degree of sophisticated language use. Appendix C illustrates how zero-inflated models estimate these two components, with detailed equations for each model.

Hypothesis 2, which predicted that participants of higher social status would dominate their group's opinions, was tested at the group level by calculating the percentage of group-issue combinations dominated by socially advantaged participants (Luskin et al. 2022).

Hypothesis 3, which examined whether participants feel pressured to conform to the opinions of articulate participants was investigated drawing on social conformity research (Sanders 2012), addressing the question, 'Is the degree of opinion change dependent on the gap between one's opinion and that of vocal participants?' For participants who provided opinions (excluding 'Don't know'), their post-deliberation opinion change was regressed on both their pre-deliberation opinions and the social comparison pressure. Additionally, I examined how a participant's advantage moderates this effect, testing the hypothesis that less advantaged participants are more prone to defer to the opinions of those with greater advantages. Appendix E contains the regression models used in this analysis.

All models were fitted using R version 4.4.1 (R Core Team 2024). Generalized linear mixed models (GLMMs) were estimated via the glmmTMB package (Brooks et al. 2017), and all results were visualized using ggplot2 (Wickham 2016). To compute Nakagawa pseudo R^2 values and the intraclass correlation coefficient (ICC),[4] I employed the sjPlot package (Lüdecke 2023).

Results

On average, participants spent 208 seconds speaking on Day 1 and 241 seconds on Day 2, representing the total duration of verbal engagement during the Deliberative Poll. The average number of speech turns was 8 on Day 1 and 9 on Day 2. Also, the number of justified speech acts averaged 5 on Day 1 and 6 on Day 2. Additionally, the degree of sophisticated language use was 0.27 on Day 1 and 0.27 on Day 2. **Table 3** provides descriptive statistics over the two days of deliberation.

Pearson correlation analysis across all indicators of deliberative advantage showed language sophistication has very weak positive but statistically significant correlations with other indicators. The result from the Pearson correlation analysis is reported in **Table 4**.

On Day 1, among 589 participants, 61 never spoke and 110 provided no justified speech acts—of whom 61 were non-speakers. On Day 2, among 544 participants, 39 never spoke and 81 provided no justified speech acts—of whom 37 were non-speakers. Appendix F includes histograms illustrating the distribution.

Table 3: Descriptive statistics of indicators of deliberative advantage among participants who completed all surveys.

Distinction	Indicators	Mean	SD	Min	Max
Day 1 (n = 589)	Speaking time	207.78	203.43	0.00	1069.00
	Speech turn	8.04	6.68	0.00	36.00
	Num. of justified speech acts	4.94	4.75	0.00	28.00
	Degree of sophisticated language use	0.27	0.16	0.00	0.95
Day 2 (n = 544)	Speaking time	24.63	239.70	0.00	1596.00
	Speech turn	8.58	7.01	0.00	37.00
	Num. of justified speech acts	6.16	5.56	0.00	34.00
	Degree of sophisticated language use	0.27	0.16	0.00	0.90

Table 4: Correlation analysis between the indicators of deliberative advantage among participants who completed all surveys.

Day 1	Speech turn	Num. of justified speech acts	Degree of sophisticated language use
Speaking time	0.94 (p = 0.00)	0.95 (p = 0.00)	0.16 (p = 0.00)
Speech turn		0.94 (p = 0.00)	0.17 (p = 0.00)
Num. of justified speech acts			0.17 (p = 0.00)
Day 2	**Speech turn**	**Num. of justified speech acts**	**Degree of sophisticated language use**
Speaking time	0.95 (p = 0.00)	0.96 (p = 0.00)	0.08 (p = 0.06)
Speech turn		0.95 (p = 0.00)	0.09 (p = 0.03)
Num. of justified speech acts			0.10 (p = 0.02)

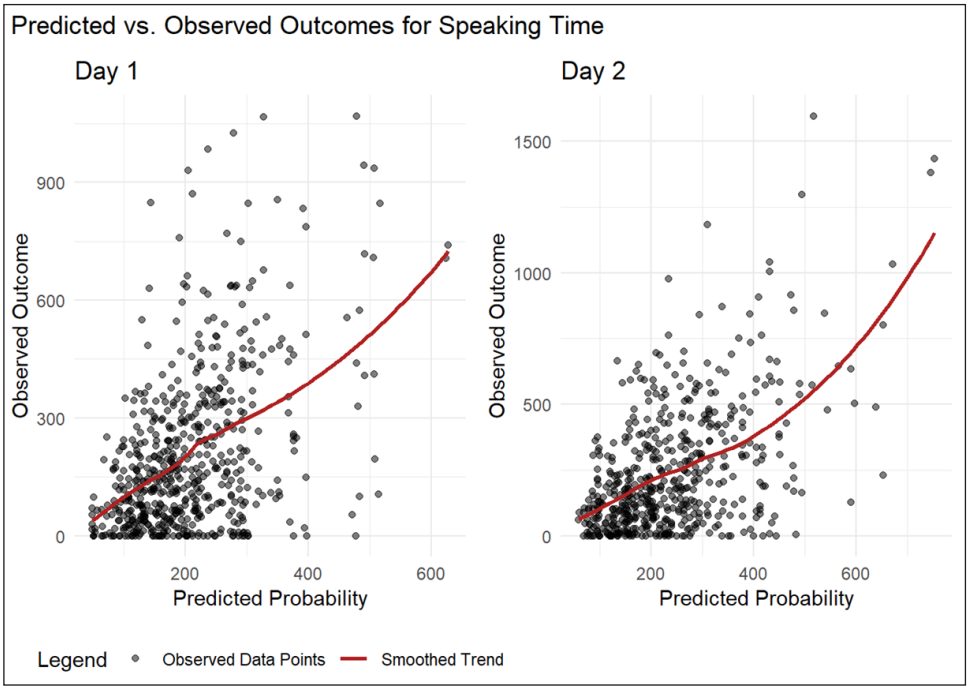

Figure 1: Graphic model fit explanation on speaking time.

Hypothesis 1: The socially more advantaged have more deliberative advantage

Mixed ZIP regression models and a ZI-Beta regression model were fitted to examine Hypothesis 1, which posits that socially more advantaged participants have greater deliberative advantage. Overall, the analyses confirmed that socially more advantaged participants exhibited more speaking time, speech turns, number of justified speech acts, and degree of sophisticated language use. Each model is described below.

Speaking time

All types of social advantage significantly increased speaking time relative to the baseline (female, person of color, and enrolled in college for a bachelor's degree) on both days of deliberation. Specifically, being male was corresponded to a 34% increase on Day 1 (*IRR* = 1.34, *p* = 0.000) and 54% on Day 2 (*IRR* = 1.54, *p* = 0.000). Likewise, being White (*IRR* = 1.22, *p* = 0.000 for Day 1; *IRR* = 1.27, *p* = 0.000 for Day 2) and having higher education (*IRR* = 1.30, *p* = 0.000 for Day 1; *IRR* = 1.54, *p* = 0.000 for Day 2) also predicted longer speaking times.

Interestingly, lower educational attainment showed a complex relationship with speaking time. Although having less education than the baseline modestly increased speaking time on Day 1 (5% above baseline; IRR = 1.05, *p* = 0.000), it became more pronounced on Day 2 (26% above baseline; IRR = 1.26, *p* = 0.000). However, the zero-inflation model revealed that on Day 1, lower education was associated with a higher likelihood of zero speaking time (*IRR* = 3.80, *p* = 0.000 for Day 1) though this effect was not significant on Day 2 (*IRR* = 1.80, *p* = 0.140). Thus, while more non-speakers emerged among less-educated participants on Day 1, those who did speak on Day 2 spoke substantially longer.

Random effects for small-group assignments indicated modest variability between groups (τ_{00}), with low intraclass correlation coefficients (ICC) for both days. This suggests 5% of the variance in speaking time was attributable to group differences. Marginal R^2 values indicated that social advantages were significant but not dominant predictors. Conditional R^2 values showed that including random effects explained 6% and 9% of the variance, respectively. The low pseudo R^2 values, consistent with the probability plots in **Figure 1**, imply the models do not fully account

Table 5: Results from the ZIP regression model of the relation between speaking time and gender, race, and education.

Fixed Effects	Day 1				Day 2			
	Null Model		Predictor Model		Null Model		Predictor Model	
	IRR	*95% CI*	*IRR*	*95% CI*	*IRR*	*95% CI*	*IRR*	*95% CI*
Count Model								
(Intercept) β_0	206.15***	186.58: 227.76	150.21***	136.54: 165.26	240.40***	218.47: 264.53	144.76***	130.32: 160.81
Male β_1			1.34***	1.33:1.36			1.54***	1.52:1.55
White β_2			1.22***	1.21:1.24			1.27***	1.26:1.29
Less Education β_3			1.05***	1.03:1.07			1.26***	1.24:1.28
More Education β_4			1.30***	1.28:1.32			1.54***	1.52:1.56
Zero-Infl. Model								
(Intercept γ_0)	0.09***	0.07:0.12	0.06***	0.03:0.12	0.07***	0.05:0.09	0.10***	0.06:0.19
Male γ_1			0.91	0.48:1.70			0.49	0.22:1.11
White γ_2			0.83	0.44:1.55			0.50	0.23:1.09
Less Education γ_3			3.80 ***	1.93:7.51			1.80	0.82:3.93
More Education γ_4			0.92	0.39:2.21			0.54	0.19:1.51
Random Effects								
Within-group Var σ^2		3.05		2.98		2.93		2.75
Between-group Var τ_{00}		$0.15_{group501}$		$0.13_{group501}$		$0.13_{group502}$		$0.16_{group502}$
ICC		0.05		0.04		0.04		0.05
Observations		590, $60_{group501}$		590, $60_{group501}$		544, $56_{group502}$		544, $56_{group502}$
Marginal/Conditional R^2		0.00/0.05		0.02/0.06		0.00/0.04		0.03/0.09
AIC		76173.9		70714.6		89564.0		78263.4
Chi-square				df(8) = 5475.4				df(8) = 11317

Note: IRR stands for Incident Rate Response. *$p < 0.05$ **$p < 0.01$ ***$p < 0.001$.

for the observed data. **Table 5** summarizes the mixed ZIP regression results for speaking time.

Speech turns

The mixed ZIP regression model for speech turns mirrored the speaking time findings, revealing that socially advantaged participants spoke more frequently. Being male was linked to more speech turns on both Day 1 (*IRR* = 1.27, $p = 0.000$) and Day 2 (*IRR* = 1.33, $p = 0.000$). Similarly, being White (Day 1: *IRR* = 1.22, $p = 0.000$; Day 2: *IRR* = 1.24, $p = 0.000$) and having higher education (Day 1: *IRR* = 1.28, $p = 0.000$; Day 2: *IRR* = 1.42, $p = 0.000$) were positively correlated with increased speech turns.

As with speaking time, lower educational attainment had nuanced effects. On Day 1, it did not significantly change the count of speech turns, though the zero-inflation model indicated that participants with lower education were more likely to have zero speech turns (*IRR* = 3.92, $p = 0.000$). On Day 2, however, lower education was significantly associated with a 27% increase in speech turns (*IRR* = 1.27, $p = 0.000$).

Random effects showed modest variability between groups (τ_{00}), with the ICC suggesting that 7–8% of variance was due to group differences. Marginal R^2 values and conditional R^2 values similarly point to a moderate influence of social advantage. **Table 6** provides the mixed ZIP regression results, and **Figure 2** indicates the model only partially explains the data.

Number of justified speech acts

A mixed ZIP regression confirmed that social advantages predicted a higher number of justified speech acts. Being male was associated with more justified speech acts on Day 1 (*IRR* = 1.19, $p = 0.000$) and Day 2 (*IRR* = 1.33, $p = 0.000$). Likewise, being White (*IRR* = 1.24, $p = 0.000$ for Day 1; *IRR* = 1.22, $p = 0.000$ for Day 2) and having higher education (*IRR* = 1.20, $p = 0.000$ for Day 1; *IRR* = 1.37, $p = 0.000$ for Day 2) corresponded to more justified speech acts. Interestingly, participants with lower education produced 20% more justified speech acts on Day 2 (*IRR* = 1.20, $p = 0.000$) but showed no difference Day 1 (*IRR* = 0.95, $p = 0.40$).

Results from the zero-inflation model on Day 2 indicated that being male (*IRR* = 0.46, $p = 0.01$), White (*IRR* = 0.53, $p = 0.02$), and well-educated (*IRR* = 0.47, $p = 0.04$) reduced the likelihood of producing zero justified speech acts. Lower education did not significantly raise the probability of zero justified speech acts. Random effects (τ_{00}) for Day 1 and Day 2 meant 10% and 8% of variance, respectively, lay between groups. Marginal R^2 and conditional R^2 again show that while social advantage is a factor, it does not account for most of the variance **(Figure 3)**. **Table 7** details these results.

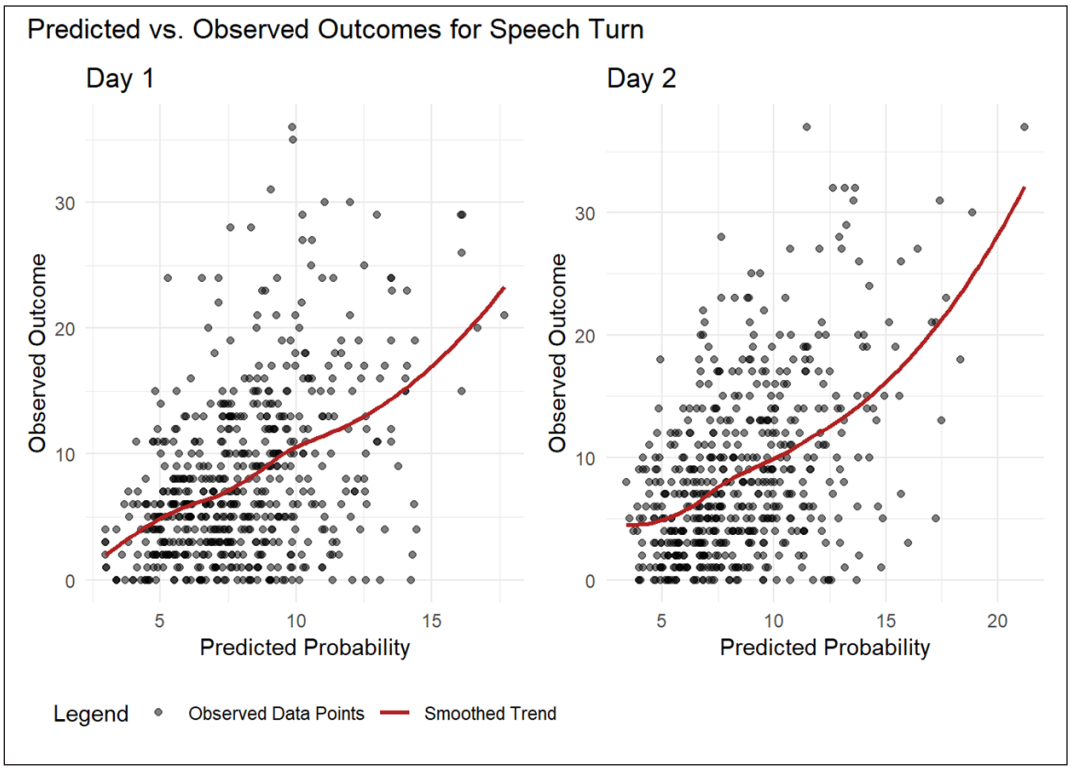

Figure 2: Graphic model fit explanation on speech turn.

Table 6: Results from the ZIP regression model of the relation between speech turns and gender, race, and education.

Fixed Effects	**Day 1**				**Day 2**			
	Null Model		**Predictor Model**		**Null Model**		**Predictor Model**	
	IRR	***95% CI***	***IRR***	***95% CI***	***IRR***	***95% CI***	***IRR***	***95% CI***
Count Model								
(Intercept) β_0	8.30***	7.68:8.98	6.21***	5.67:6.80	8.91***	8.30:9.57	5.99***	5.45:6.60
Male β_1			1.27***	1.20:1.35			1.33***	1.25:1.41
White β_2			1.22***	1.15:1.30			1.24***	1.17:1.32
Less Education β_3			1.08	0.99:1.17			1.27***	1.17:1.38
More Education β_4			1.28***	1.19:1.38			1.42***	1.32:1.52
Zero-Infl. Model								
(Intercept) γ_0	0.09***	0.06:0.12	0.06***	0.03:0.12	0.07***	0.05:0.10	0.11***	0.06:0.20
Male γ_1			0.93	0.49:1.78			0.54	0.24:1.20
White γ_2			0.83	0.43:1.58			0.46	0.21:1.01
Less Education γ_3			3.92***	1.94:7.90			1.88	0.87:4.07
More Education γ_4			0.96	0.39:2.33			0.52	0.19:1.47
Random Effects								
Within-group Var σ^2	0.96		0.94		0.93		0.89	
Between-group Var τ_{00}	$0.08_{group501}$		$0.07_{group501}$		$0.06_{group502}$		$0.07_{group502}$	
ICC	0.08		0.07		0.06		0.08	
Observations	$590, 60_{group501}$		$590, 60_{group501}$		$544, 56_{group502}$		$544, 56_{group502}$	
Marginal/Conditional R^2	0.00/0.08		0.04/0.10		0.00/0.06		0.05/0.13	
AIC	4588.6		4422.4		4461.9		4230.7	
Chi-square			df(8) = 182.22				df(8) = 247.23	

Note: IRR stands for Incident Rate Response. $^*p < 0.05$ $^{**}p < 0.01$ $^{***}p < 0.001$.

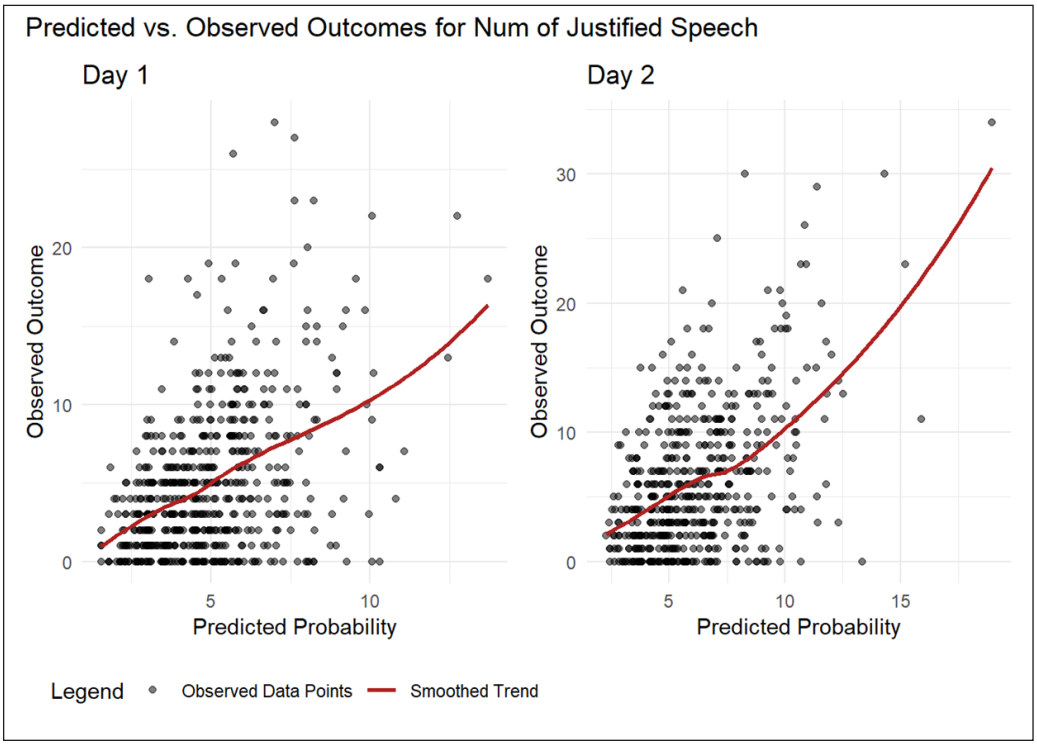

Figure 3: Graphic model fit explanation on number of justified speech acts.

Table 7: Results from the ZIP regression model of the relation between the number of justified speech acts and gender, race, and education.

Fixed Effects	**Day 1**				**Day 2**			
	Null Model		**Predictor Model**		**Null Model**		**Predictor Model**	
	IRR	***95% CI***	***IRR***	***95% CI***	***IRR***	***95% CI***	***IRR***	***95% CI***
Count Model								
(Intercept) β_0	5.42***	4.92:5.97	4.31***	3.84:4.84	6.931***	6.40:7.49	4.75***	4.26:5.30
Male β_1			1.19***	1.10:1.29			1.33***	1.24:1.43
White β_2			1.24***	1.14:1.34			1.22***	1.13:1.31
Less Education β_3			0.95	0.86:1.06			1.20***	1.09:1.33
More Education β_4			1.20***	1.09:1.31			1.37***	1.26:1.49
Zero-Infl. Model								
(Intercept) γ_0	0.17***	0.14:0.23	0.22***	0.14:0.34	0.16***	0.12:0.20	0.30***	0.19:0.46
Male γ_1			0.64	0.38:1.07			0.46**	0.26:0.83
White γ_2			0.71	0.43:1.17			0.53*	0.31:0.91
Less Education γ_3			1.77*	1.02:3.09			1.17	0.64:2.13
More Education γ_4			0.64	0.33:1.23			0.47*	0.23:0.95
Random Effects								
Within-group Var σ^2	0.98		0.94		1.01		0.95	
Between-group Var τ_{00}	$0.12_{group501}$		$0.11_{group501}$		$0.07_{group502}$		$0.09_{group502}$	
ICC	0.11		0.10		0.07		0.08	
Observations	590, $60_{group501}$		590, $60_{group501}$		544, $56_{group502}$		544, $56_{group502}$	
Marginal/Conditional R^2	0.00/0.11		0.03/0.13		0.00/0.07		0.05/0.12	
AIC	3595.6		3517.0		3684.5		3528.5	
Chi-square			df(8) = 94.55				df(8) = 172	

Note: IRR stands for Incident Rate Response. *$p < 0.05$ **$p < 0.01$ ***$p < 0.001$.

Degree of sophisticated language use

A ZI-Beta regression model confirmed that social advantage correlates with sophisticated language use. Being male was associated with a 22% increase in the odds of using sophisticated language on Day 1 ($OR = 1.22$, $p = 0.001$) and a 15% increase on Day 2 ($OR = 1.15$, $p = 0.027$). Conversely, lower educational attainment decreased the odds of using sophisticated language by 31% on Day 1 ($OR = 0.69$, $p = 0.000$). Neither being White nor having higher education levels significantly affected sophisticated language use.

The zero-inflated model results revealed that lower education was correlated with the likelihood of zero sophisticated language use on Day 1 ($OR = 3.39$, $p = 0.000$). Minimal between-group variability (τ_{00}) and ICC on both days, suggest that nearly all variability in sophisticated language use was at the individual level. Marginal R^2 values and conditional R^2 values indicate that the model, including both fixed and random effects, explained little variance in sophisticated language use **(Figure 4)**. **Table 8** presents the fitted ZI-beta regression results.

Hypothesis 2: Socially more advantaged participants influence group opinions

To examine Hypothesis 2, which posits that more advantaged participants would shape group opinions, I compared post-deliberation attitudes and pre-deliberation attitudes for all group-issue combinations ($n = 460$). A group-issue combination was deemed 'dominated' if its post-deliberation opinion shifted toward the pre-deliberation attitudes of the more advantaged participants. **Table 9** presents the count of group-issue combinations dominated by participants of specific establishment types, where relevant. The proportion of group-issue combinations dominated by the more advantaged participants ranged from 48.04% to 57.84%. Notably, among the groups that included participants who were male, White, and educated beyond an associate's degree, 53.95% of the group-issue combinations were dominated.

Hypothesis 3: More deliberatively advantaged participants' opinions influence less advantaged participants' opinion formation

The effect of exposure to, and pressure from, participants with deliberative advantages—characterized by high speaking time, speech turns, number of justified speech acts, and degree of sophisticated language use—on post-deliberation opinions was examined across eight agenda items over two days using linear regression models. The analysis considered both the direct effect of pressure and the moderating roles of participants' social advantages, including gender, race, and education level. As shown in **Table 10**, the impact of pressure on post-deliberation opinions varied by agenda item.

Overall, the direct effect of pressure from expressive participants on post-deliberation opinions produced mixed results. Of the eight agenda items, two showed significant effects on opinion change. For example, during the discussion on ranked-choice voting (Agenda 3 of Day 1), pressure led participants to align their opinions more closely with those of high-deliberative-advantage participants ($\hat{\beta} = 0.22$, $t(479) = 2.27$, $p = 0.02$). Conversely, in the discussion about prioritizing vulnerable communities for the Civilian Climate Corps (Agenda 2 of Day 2), pressure decreased support for the proposal ($\hat{\beta} = -0.34$, $t(430) = -2.41$, $p = 0.02$). Across all agenda items, the most consistent direct predictor of post-deliberation opinion was each participant's pre-deliberation opinion, which exhibited positive coefficients throughout.

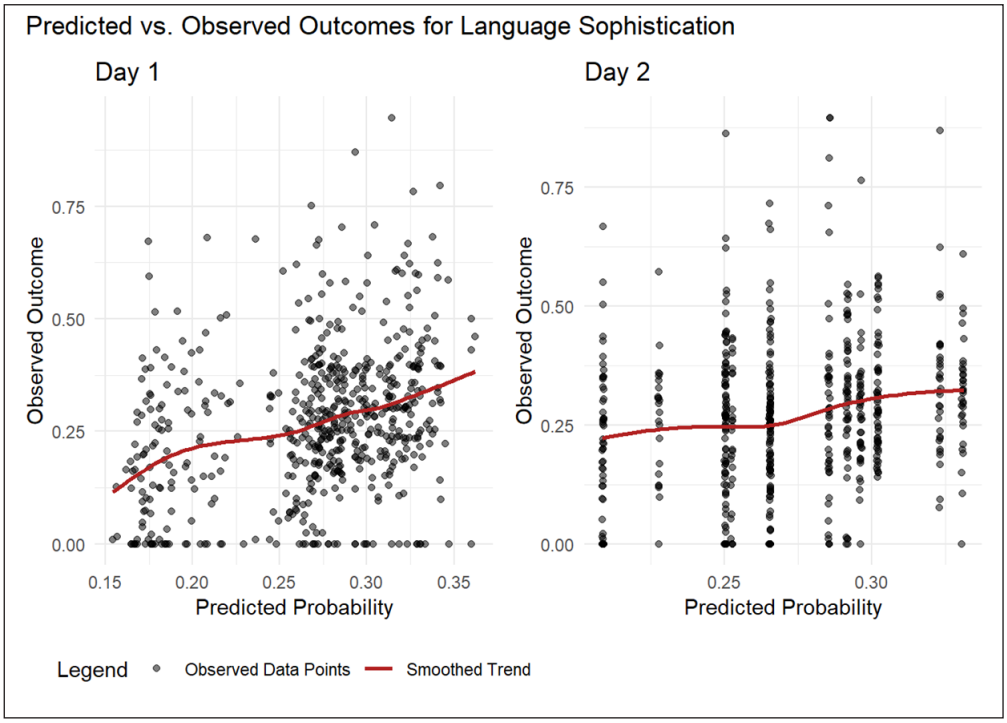

Figure 4: Graphic model fit explanation on degree of language sophistication.

Table 8: Results from the ZI-Beta regression model of the relation between the degree of sophisticated language use and gender, race, and education.

Fixed Effects	Day 1				Day 2			
	Null Model		Predictor Model		Null Model		Predictor Model	
	IRR	*95% CI*	*IRR*	*95% CI*	*IRR*	*95% CI*	*IRR*	*95% CI*
Count Model								
(Intercept) β_0	0.42***	0.39:0.45	0.41***	0.36:0.46	0.41***	0.39:0.44	0.38***	0.34:0.43
Male β_1			1.22**	1.08:1.38			1.15*	1.02:1.30
White β_2			1.06	0.94:1.20			1.02	0.90:1.15
Less Education β_3			0.69 ***	0.58:.81			0.86	0.73: 1.01
More Education β_4			0.98	0.86:1.13			1.12	0.97:1.29
Zero-Infl. Model								
(Intercept) γ_0	0.10***	0.08:0.13	0.08***	0.04:0.14	0.07***	0.05:0.10	0.11***	0.06:0.20
Male γ_1			0.89	0.49:1.62			0.47	0.21:1.06
White γ_2			0.95	0.53:1.71			0.55	0.26:1.17
Less Education γ_3			3.39***	1.80:6.39			1.71	0.79:3.70
More Education γ_4			0.73	0.31:1.70			0.51	0.18:1.41
Random Effects								
Within-group Var σ^2	4.55		4.60		4.57		4.59	
Between-group Var τ_{00}	$0.02_{group501}$		$0.02_{group501}$		$0.01_{group502}$		$0.00_{group502}$	
ICC	0.01		0.00		0.00		0.00	
Observations	590, $60_{group501}$		590, $60_{group501}$		544, $56_{group502}$		544, $56_{group502}$	
Marginal/Conditional R^2	0.00/0.01		0.01/0.01		0.00/0.00		0.00/0.00	
AIC	−175.2		−216.3		−265.81		−277.3	
Chi-square			df(8) = 57.07				df(8) = 27.51	

Note: IRR stands for Incident Rate Response. $^*p < 0.05$ $^{**}p < 0.01$ $^{***}p < 0.001$.

Table 9: The percentage of the group-issue combinations that were dominated.

Type of advantage	Num. of Group-issue Combination	Num. of Dominated (%)	Num. of Not Dominated (%)
Male	448	248 (55.36%)	200 (44.64%)
White	458	238 (51.97%)	220 (48.03%)
More than an associate's degree (Edu1)	460	221 (48.04%)	239 (51.96%)
More than a bachelor's degree (Edu 2)	425	215 (50.56%)	210 (49.41%)
Male and white	389	201 (51.67%)	188 (48.33%)
Male and Edu 1	307	163 (56.46%)	144 (43.54%)
Male and Edu 2	441	249 (53.09%)	192 (48.91%)
White and Edu 1	449	241 (53.67%)	208 (46.33%)
White and Edu 2	287	158 (55.05%)	129 (44.95%)
Male, white, and Edu 1	354	191 (53.95%)	163 (46.05%)
Male, white, and Edu 2	204	118 (57.84%)	86 (42.16%)

To investigate whether the impact of pressure differed based on participants' social advantages, moderating effects were analyzed. While demographic factors did moderate this relationship, patterns were not uniform across all agendas. Generally, the pressure–gender interaction was nonsignificant. However, being White positively moderated the link between pressure and post-deliberation opinion during Agenda 2 on Day 2 ($\hat{\beta} = 0.37$, $t(430) = 2.49$, $p = 0.01$). This moderation effect is illustrated in **Figure 5**.

Table 10: Results from the linear regression model of the relation between opinion degree and the conformity pressure.

Predictors	Day 1						Day 2									
	Agenda 1		Agenda 2		Agenda 3		Agenda 1		Agenda 2		Agenda 3		Agenda 4		Agenda 5	
	Est	*CI*	*Est.*	*CI*	*Est.*	*CI*	*Est.*	*CI*	*Est.*	*CI*	*Est.*	*CI*	*Est.*	*CI*	*Est.*	*CI*
(Intercept) β_0	2.52***	1.67:3.37	4.71***	3.81:5.62	4.06***	3.21:4.91	2.59***	1.63:3.54	4.57***	3.62:5.52	3.20***	1.99:4.40	1.42**	0.50:2.34	3.59***	2.73:4.46
Pre-del Opinion β_1	0.65***	0.58:0.73	0.28***	0.20:0.37	0.43***	0.35:0.50	0.68***	0.58:0.77	0.46***	0.36:0.56	0.46***	0.35:0.57	0.66***	0.59:0.73	0.62***	0.54:0.70
Pressure β_2	−0.13	−0.32:0.07	0.12	−0.14:0.39	0.22*	0.03:0.41	−0.06	−0.39:0.27	−0.34*	−0.63:−0.06	−0.24	−0.53:0.04	−0.02	−0.23:0.19	−0.16	−0.35:0.03
Male β_3	−0.74*	−1.45:−0.03	0.39	−0.32:1.10	0.17	−0.51:0.86	−1.01*	−1.78:−0.23	−1.03**	−1.74:−0.32	−0.75	−1.58:0.08	0.12	−0.69:0.93	−0.56*	−1.11:−0.01
White β_4	0.23	−0.45:0.91	0.53	−0.18:1.25	0.59	−0.09:1.28	0.55	−0.23:1.33	−0.22	−0.91:0.46	−0.50	−1.34:0.33	0.71	−0.09:1.51	0.19	−0.35:0.73
Less edu β_5	0.29	−0.58:1.16	0.19	−0.73:1.11	0.19	−0.69:1.08	1.55**	0.54:2.56	0.41	−0.51:1.33	−0.74	−1.86:0.38	1.19*	0.10:2.28	−0.98**	−1.69:−0.28
Well edu β_6	−0.08	−0.89:0.72	0.43	−0.39:1.26	0.02	−0.78:0.82	0.20	−0.68:1.09	−0.72	−1.51:0.06	0.30	−0.65:1.26	0.72	−0.19:1.63	−0.01	−0.62:0.61
Pressure × Male β_7	0.13	−0.09:0.34	−0.14	−0.40:0.13	−0.15	−0.37:0.07	0.11	−0.19:0.42	0.10	−0.20:0.41	0.15	−0.16:0.45	0.10	−0.14:0.35	0.01	−0.19:0.20
Pressure × White β_8	−0.09	−0.30:0.12	−0.12	−0.38:0.15	−0.07	−0.29:0.15	−0.20	−0.52:0.11	0.37*	0.08:0.67	0.13	−0.17:0.43	−0.17	−0.41:0.06	−0.01	−0.21:0.18
Pressure × Less edu β_9	−0.05	−0.31:0.22	−0.08	−0.41:0.25	−0.15	−0.42:0.12	−0.53**	−0.92:−0.13	0.05	−0.32:0.41	0.40*	0.02:0.78	−0.28	−0.60:0.03	0.47***	0.22:0.72
Pressure × Well edu β_{10}	−0.01	−0.26:0.24	−0.21	−0.52:0.09	−0.14	−0.40:0.12	−0.14	−0.49:0.21	0.21	−0.13:0.56	0.03	−0.31:0.38	−0.17	−0.45:0.10	−0.07	−0.28:0.15
Obs.	535		466		490		343		441		506		492		488	
R^2/R^2 adj	0.459/0.449		0.110/0.091		0.244/0.228		0.428/0.411		0.227/0.209		0.162/0.145		0.434/0.422		0.453/0.442	

Note: $^*p < 0.05$ $^{**}p < 0.01$ $^{***}p < 0.001$.

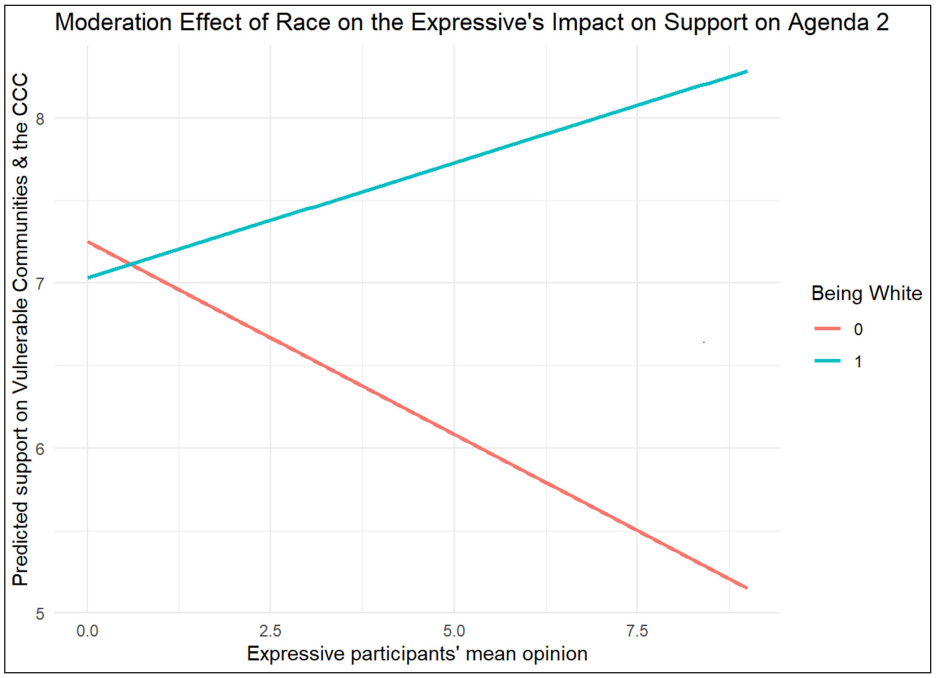

Figure 5: Moderation of race on expressive participants' pressure to conform (Day 2 Agenda 2).

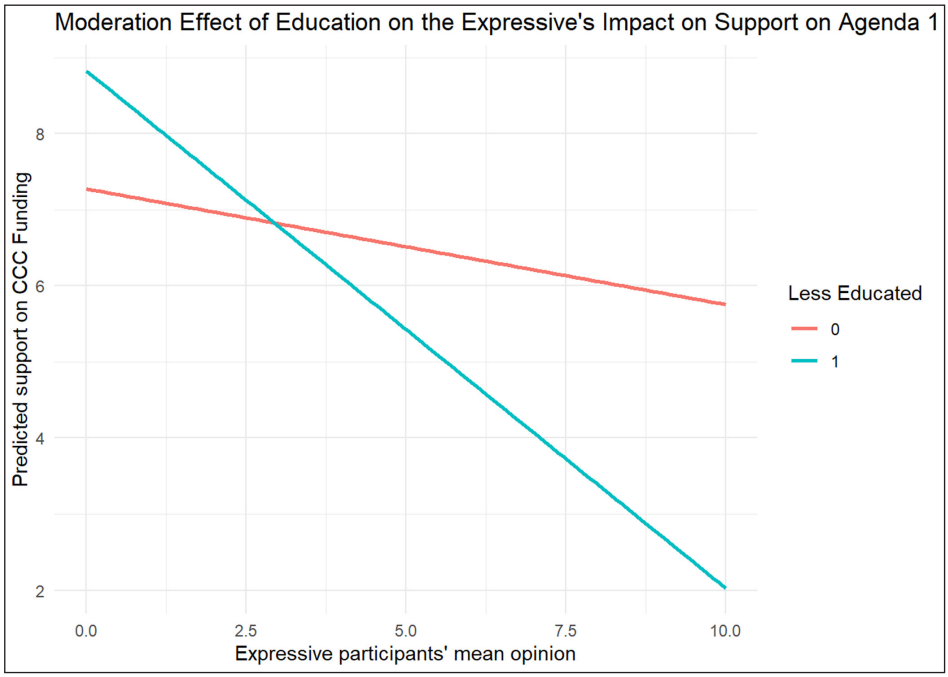

Figure 6: Moderation of low education on expressive participants' pressure to conform (Day 2 Agenda 1).

Lower educational attainment also produced varied responses to pressure. For instance, during discussions on funding the Civilian Climate Corps (Agenda 1 of Day 2), participants with lower education expressed less support for the proposal the more their opinions diverged from those of advantaged participants ($\hat{\beta} = -0.53$, $t(332) = -2.62$, $p = 0.009$), illustrated in **Figure 6**. In contrast, on regional minimum income (Agenda 3 of Day 2) and wealth tax (Agenda 5 of Day 2), these same participants felt stronger pressure to conform ($\hat{\beta} = 0.40$, $t(332) = 2.06$, $p = 0.04$ for Day 2 Agenda 3, $\hat{\beta} = 0.47$, $t(477) = 3.73$, $p = 0.000$ for Day 2 Agenda 5), as shown in **Figures 7** and **8** respectively.

The models that showed either a direct effect of pressure or a significant interaction between pressure and social advantage generally exhibited moderate explanatory power, with adjusted R^2 values ranging from 0.15 to 0.45 across the agenda items.

Discussion

This research used text analysis of transcripts to investigate whether participants with greater social advantage would dominate deliberation. Findings confirmed Hypothesis 1, showing that socially advantaged participants spoke longer, took more turns, offered more justified speech acts, and

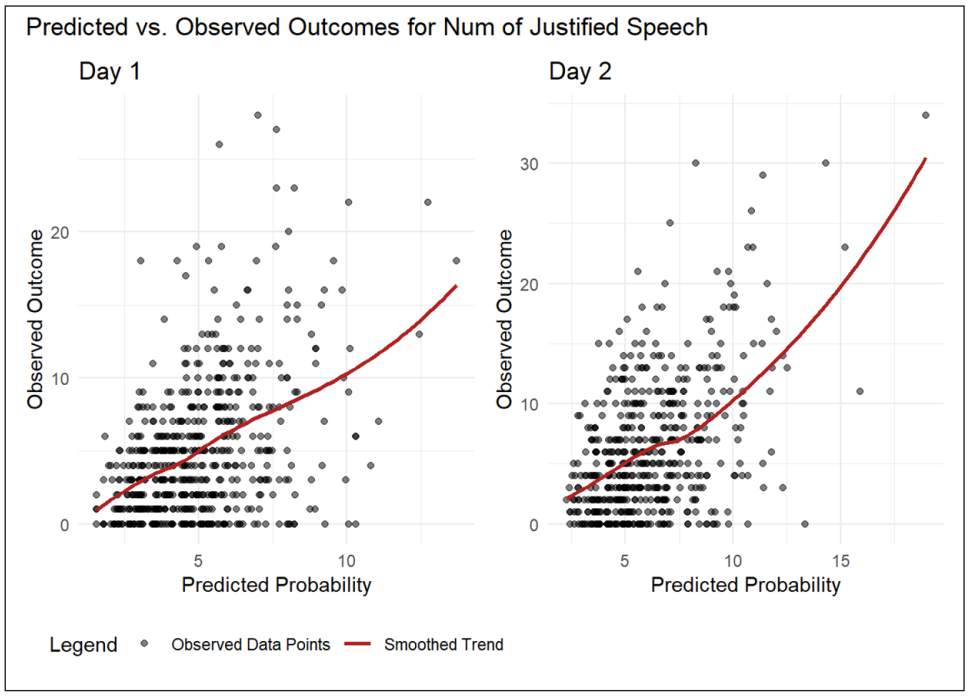

Figure 7: Moderation of low education on expressive participants' pressure to conform (Day 2 Agenda 3).

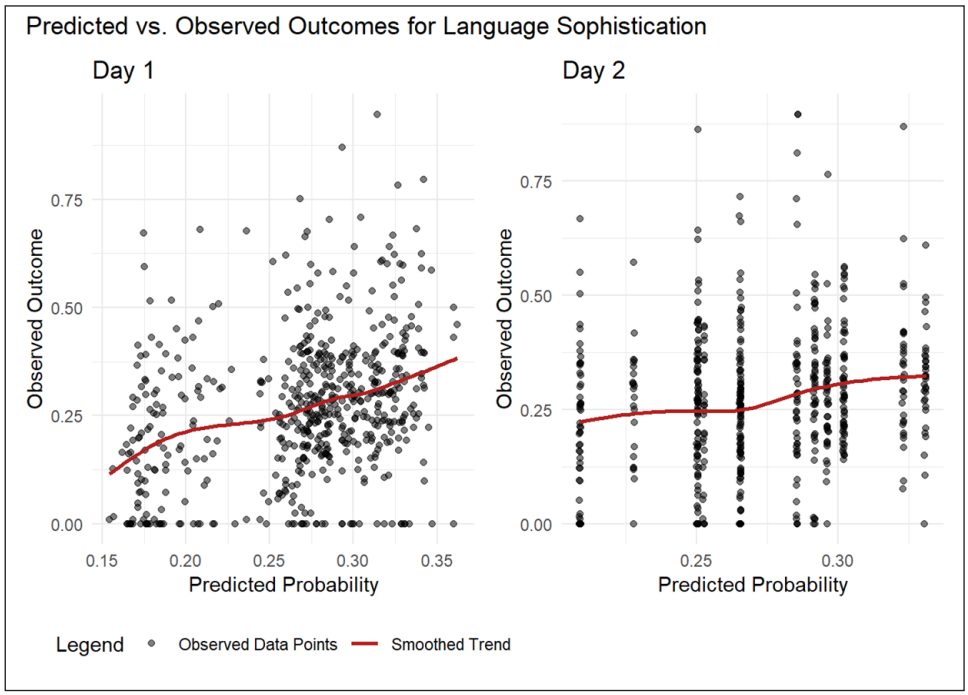

Figure 8: Moderation of low education on expressive participants' pressure to conform (Day 2 Agenda 5).

spoke more sophisticatedly. Lower educational attainment had a negative effect on using more sophisticated language. However, low pseudo-R^2 values indicate that social advantage alone is not a strong predictor of deliberative advantages. Testing Hypothesis 2, which posited that socially advantaged participants would dominate group opinions, resulted with about half of the group-issue combinations showing domination. These results align with Siu (2017) and Luskin et al. (2022), who reported similar rates. Hypothesis 3, the opinions of participants with deliberative advantage will impact the opinions of participants without, was not supported. Linear regression models revealed that pressure from more expressive participants did not uniformly alter opinions across agendas. This finding echoes Siu (2017), indicating that social advantage does not invariably translate into deliberative advantage.

This study offers counterevidence to the claim that deliberation is consistently dominated by socially advantaged participants. While Hypothesis 1 confirmed that traditional deliberative skills were more evident among participants with higher education, there were also instances—particularly in discussing climate change

and wealth inequality—where those with less education (below the BA level) spoke longer, more often, and contributed more justified speech acts than baseline participants (enrolled in a BA program). Moreover, the group opinions were not 'swayed' by the views of socially advantaged participants, nor were individual opinions dictated by more skilled participants. This suggests that opinion formation may also reflect other deliberative components, such as reading briefing material and attending plenary sessions featuring expert Q&A.

Nonetheless, this study has limitations. First, it did not consider any cumulative or educational effects from Day 1's deliberation on Day 2's deliberation. Second, the research used a convenience sample that is not representative of a population, limiting its generalizability. Third, to verify the measurement of justified arguments, human coders would be required; while this study triangulated deliberative advantage with four variables, further validation is still desirable. Fourth, the definition of 'justified speech acts' is narrow, rooted in a rational-legal context. As a result, this research cannot capture broader modes of deliberation that reflect evolving theoretical perspectives. Hence, newer measures like Deliberative Capital (Afsahi 2021) should be used in future research in assessing domination.

Despite these constraints, this study demonstrates that disparities linked to demographic factors were observed, social advantage did not consistently translate into post-deliberation opinion shifts. These findings underscore the need for further research on creating more equitable deliberative contexts, ensuring that all voices—regardless of social advantage—are included and respected. Also, future research should highlight what social minorities brought to the deliberative table.

Notes

[1] For more information about the event, please refer to Final Report: Shaping Our Future. found at https://drive.google.com/file/d/1IV2rpBvfe2VW6aWrghNlCEphFARrz55o/view?usp=sharing.

[2] The question was: 'What was your estimated household income level last year?'.

[3] How each type of error contributes for the existence of extra zeros is detailed in Zuur et al. (2009).

[4] Nakagawa pseudo R^2 provides conditional R^2, how the entire model explains the outcome's variance, and marginal R^2, how outcome's variance is attributed to the fixed effects alone for GLMMs. For a deeper discussion, see Rights & Sterba (2020).

Additional Files

The additional files for this article can be found as follows:

- **Appendix A.** Agenda discussed in deliberation. DOI: https://doi.org/10.16997/jdd.1549.s1
- **Appendix B.** Examples of DeliBERT and LIWC Analytical Thinking. DOI: https://doi.org/10.16997/jdd.1549.s2
- **Appendix C.** Structure of zero-inflated models and formula used for estimation. DOI: https://doi.org/10.16997/jdd.1549.s3
- **Appendix D.** Domination Index. DOI: https://doi.org/10.16997/jdd.1549.s4
- **Appendix E.** Fitting the degree of opinions affected by the more advantaged participants. DOI: https://doi.org/10.16997/jdd.1549.s5
- **Appendix F.** Histograms that explain outcome variables' distribution. DOI: https://doi.org/10.16997/jdd.1549.s6

Competing Interests

The author has no competing interests to declare.

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